

## NOTICES OF PUBLIC INFORMATION

Notices of Public Information contain corrections that agencies wish to make to their notices of rulemaking; miscellaneous rulemaking information that does not fit into any other category of notice; and other types of information required by statute to be published in the *Register*. Because of the variety of material that is contained in a Notice of Public Information, the Office of the Secretary of State has not established a specific format for these notices.

### NOTICE OF PUBLIC INFORMATION

#### DEPARTMENT OF ENVIRONMENTAL QUALITY

[M13-43]

1. **A.R.S. Title and its heading:** 49, The Environment  
**A.R.S. Chapter and its heading:** 2, Water Quality Control  
**A.R.S. Article and its heading:** 2.1, Total Maximum Daily Loads  
**Section:** A.R.S. § 49-234, Total maximum daily loads; implementation plans

2. **The public information relating to the listed statute:**

Pursuant to A.R.S. § 49-234, the Arizona Department of Environmental Quality (Department or ADEQ) is required to develop a total maximum daily load (TMDL) for navigable waters that are listed as impaired. The purpose of this notice is to publish the Department's determinations of total pollutant loadings for a TMDL for the San Pedro River (Reach 15050203-001, Aravaipa Creek - Gila River) that the Department intends to submit to the Regional Administrator for Region 9, U.S. Environmental Protection Agency (EPA) for approval.

Public notice of the opportunity for public comment on the draft "San Pedro River *E. coli* TMDL Reach 15050203-001" was published in *The San Manuel Miner* of San Manuel, Ariz. and *The Copper Basin News* of Kearney, Ariz., newspapers of general circulation in the vicinity of the impaired reach, on September 5, 2012. The public comment period extended from September 14, 2012, to October 15, 2012.

3. **Total Maximum Daily Loads (TMDLs)**

A. **TMDL Process**

A TMDL represents the total load of a pollutant that can be assimilated by a waterbody on a daily basis and still meet the applicable water quality standard. The TMDL can be expressed as the total mass or quantity of a pollutant that can enter the waterbody within a unit of time. In most cases, the TMDL determines the allowable concentration or density of a pollutant in units per day and divides it among the various contributors in the watershed as wasteload (i.e., point source discharge) and load (i.e., nonpoint source) allocations. The TMDL must also account for natural background sources and provide a margin of safety.

In Arizona, as in other states, changes in standards or the establishment of site-specific standards are the result of ongoing science-based investigations or changes in toxicity criteria from EPA. Changes in designated uses and standards are part of the surface water standards triennial review process and are subject to public review. Standards are not changed simply to bring the waterbody into compliance, but are based on sound science that includes evaluation of the risk of impact to humans or aquatic and wildlife communities. Existing uses of the waterbody and natural conditions are considered when standards for specific water segments are established.

These TMDLs meet or exceed the following EPA Region 9 criteria for approval:

**Plan to meet State Surface Water Quality Standards:** The TMDLs include a study and a plan for the specific pollutants that must be addressed to ensure that applicable water quality standards are attained.

**Describe quantified water quality goals, targets, or endpoints:** The TMDL must establish numeric endpoints for the water quality standards, including beneficial uses to be protected, as a result of implementing the TMDLs. This often requires an interpretation that clearly describes the linkage(s) between factors impacting water quality standards.

**Analyze/account for all sources of pollutants:** All significant pollutant sources are described, including the location and the magnitude of sources where data is available.

**Identify pollution reduction goals:** The TMDL plan includes pollutant reduction targets for all point and nonpoint sources of pollution.

**Describe the linkage between water quality endpoints and pollutants of concern:** The TMDLs must explain the relationship between the numeric targets and the pollutants of concern and determine whether the recommended pollutant load allocations exceed the loading capacity of the receiving water.

**Develop margin of safety that considers uncertainties, seasonal variations, and critical conditions:** The TMDLs must describe how any uncertainties regarding the ability of the plan to meet water quality standards have been addressed. The plan must consider these issues in its recommended pollution reduction targets.

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**Provide implementation recommendations for pollutant reduction actions and a monitoring plan:** The TMDLs should provide a specific process and schedule for achieving pollutant reduction targets. A monitoring plan should also be included, especially where management actions will be phased in over time and to assess the validity of the pollutant reduction goals.

**Include an appropriate level of public involvement in the TMDL process:** This is usually met by publishing public notice of the TMDLs in a newspaper of general circulation in the area affected by the study, circulating the TMDLs for public comment, and holding public meetings in local communities. Public involvement must be documented in the state's TMDL submittal to EPA Region 9.

**In addition, these TMDLs specifically comply with the public notification requirements of A.R.S. Title 49, Chapter 2, Article 2.1 through this public notice:** Publication of these TMDLs in the Arizona Administrative Review (A.A.R.) is required per Arizona Revised Statute, Title 49, Chapter 2, Article 2.1 prior to submission of the TMDL to EPA. The Department shall:

1. Prepare a draft estimate of the total amount of each pollutant that causes impairment from all sources that may be added to a navigable water while still allowing the navigable water to achieve and maintain applicable surface water quality standards;
2. Determine draft allocations among the contributing sources that are sufficient to achieve the total loadings;
3. Provide public notice and allow for comment on each draft estimate and draft allocation and shall prepare written responses to comments received on the draft estimates and draft allocations.
4. Publish the determinations of total pollutant loadings that will not result in impairment and the draft allocations among the contributing sources that are sufficient to achieve the total loadings that it intends to submit initially to the regional administrator, along with a summary of the responses to comments on the estimated loadings and allocations, in the A.A.R. at least forty-five days before the submission of the loadings and allocations to the regional administrator.

Federal law only requires the submittal of the pollutant loadings to EPA for approval. However, the Department considers the pollutant loadings and the draft allocations to be integrally related and that they should be presented together to afford the public a complete understanding of the issues, outcomes and recommendations of the TMDL analysis. For that reason, the Department has combined the loadings and allocations in this publication in the A.A.R.

**B. TMDL for the San Pedro River Reach 15050203-001**

In 2004, ADEQ listed Reach 15050203-001 of the San Pedro River, extending from the confluence of the Gila River upriver to its confluence with Aravaipa Creek, on the State's 303(d) Impaired Waters List as impaired for *E. coli* based on two exceedances of the water quality standard for the Full Body Contact (FBC) designated use in 2000 and 2001. The listing was confirmed in the 2006/2008 assessment with an additional three exceedances of the *E. coli* single sample maximum (SSM) portion of the water quality standard, though one of these was later discovered to be erroneous. A TMDL study initiated in 2007 collected additional samples at all points of the typical hydrograph for multiple locations within the impaired reach and for subwatersheds and tributaries feeding the impaired reach. Critical conditions for *E. coli* exceedances were determined to be exclusively stormflow conditions. Data collected during these conditions showed persistent and high-magnitude exceedances of the SSM *E. coli* standard while all data collected in baseflow conditions met the standard. This TMDL includes load and waste load allocations developed to ensure that the San Pedro will meet the water quality standard in critical conditions, and an implementation plan incorporating best management practices for land uses found within the watershed is developed.

**TMDL CALCULATIONS**

The TMDL calculations are based on flow and concentration data analyzed using load duration curves.

The TMDL or loading capacity and the resulting load reductions necessary to meet the TMDL is determined using the TMDL equation:

$$\text{TMDL} = \sum \text{WLA} + \sum \text{LA} + \text{MOS}$$

Where WLA is waste load allocation (point sources), LA is load allocation (nonpoint sources and natural background), and MOS is a margin of safety. Loading capacity, existing loads, and reductions needed for water quality standard attainment are calculated for Reach 001 cumulative water quality data in Giga (billion)-organisms per day (G-orgs/day) for both stormflow and baseflow classes using ADEQ ambient and TMDL water quality data from December 1999 through August of 2010. The aggregate loading allocation is partitioned by land use and major contributing subwatershed.

**MARGIN OF SAFETY**

An explicit margin of safety (MOS) of 10 percent was applied to each flow class's TMDL target value before LAs and WLAs were applied. The MOS is intended to account for uncertainties and random variations associated with data collection, bacteria enumeration, equipment and method precision and accuracy limitations, and random error associated with flow measurements.

#### **WASTE LOAD ALLOCATIONS**

As of the fall of 2012, four AZPDES-permitted WWTP facilities are currently operational in the San Pedro watershed. Additionally, the Sierra Vista Tribute Water Reclamation Facility is scheduled to become operational in late 2014. Of the four existing facilities, only the Mammoth WWTP is in close proximity to the impaired reach. The other three are located in HUC 15050202 upstream of the impaired reach. Two of these three discharge to ephemeral drainages. All facilities covered under AZPDES individual permits are detailed in Table 1.

For Category 1 (baseflow) conditions, it is noted that the sum of loads from all permittees assuming maximum discharge (51.98 G-orgs/day) exceeds the available load capacity to meet water quality standards of the San Pedro River at its median target flow (33.09 G-org/day). Consequently, it is not possible to establish a numeric mass-based wasteload allocation for the category compliant with its load limit in the impaired reach. However, in baseflow conditions for Reach 15050203-001, wastewater from permittees is not being received in the impaired reach; infiltration of all water in the San Pedro hydrologic network above the Aravaipa Creek confluence is occurring far upstream of the reach origin. Thus, for the baseflow category, it is necessary to employ a concentration-based wasteload allocation instead of a mass-based load value expressed in G-orgs/day in the TMDL summation. However, there is no concern in using this alternative approach that the maximum discharge of permittees in the basin would prevent the impaired reach from meeting its TMDL target due to the spatially intermittent hydrologic character.

Furthermore, since the category analysis is predicated on the products of discharge and concentration, it can safely be surmised that if permit terms are being met at all permitted locations, waste loads for the impaired San Pedro reach should be in accordance with the premises on which this TMDL is developed. Permittees would not be considered as causing or contributing to a downstream exceedance of water quality standards in such an event. For these two reasons, all permittees are granted concentration-based waste load allocations equal to the terms of their permits in baseflow conditions.

For Category 2 (Stormflow) conditions, permittees are granted numeric mass-based wasteload allocations as itemized and summarized in Tables 1 and 2. The sum of these allocations is 51.98 G-org/day. The loads were calculated as the products of the equivalent discharge capacity of each plant (in cfs), the permit concentration limit (in colony-forming units per 100 ml), and the conversion factor 0.02446 to arrive at a value expressed in G-orgs/day.

Two MS4s exist in the San Pedro River watershed. The Sierra Vista MS4 and the state-wide ADOT MS4 are both assigned concentration-based waste load allocations for this TMDL as detailed below. Existing permittees of the MSGP and the CGP are also assigned concentration-based wasteload allocations as addressed in the following paragraph. Beyond the general guidelines presented in the following paragraph regarding points of compliance for WLAs (discharge locations to waters of the State carrying either a PBC or FBC designated use), the Stormwater Unit shall establish more specific locations when necessary on a case-by-case basis where dischargers under all general permits (MS4, MSGP, CGP) issued by ADEQ are expected to meet their WLAs. The ADEQ Stormwater Unit shall also determine whether *E. coli* loading of tributaries or the main-stem of the San Pedro River from all future general permittees has reasonable potential to occur in their permit reviews. If there is such reasonable potential, new permittees will be subject to the appropriate concentration-based WLA in this TMDL. Otherwise, new permittees' WLA shall be 0 G-orgs/day.

There is no itemized mass-based waste load allocation expressed in terms of organisms per day set aside for MS4, MSGP, and CGP activities in the San Pedro watershed that is the subject of this TMDL, as project size and scope that may be applied for within the watershed cannot be forecast for future projects, and stormflow discharges from all general permit sites are episodic and highly variable. For flows originating from existing or future sites having reasonable potential to be a source of *E. coli* and operating under MS4, CGP, or MSGP coverage, a concentration-based waste load allocation of 235 cfu/100 ml (single sample maximum) is established for direct discharge(s) to a stream reach carrying an FBC designated use consistent with the provisions governing the remainder of this TMDL, where *E. coli* is reasonably assessed as being a constituent of concern for a particular applicant or permittee. Where direct discharge(s) are to a stream reach carrying a PBC designated use, the concentration-based WLA shall be 575 cfu/100 ml unless reasonable potential for bacteriological water quality degradation of downstream FBC reaches from such discharges is assessed by the ADEQ Stormwater Unit in the SWPPP or SWMP review and approval process. In such a case, the concentration-based WLA shall be 235 cfu/100 ml. The concentration-based WLA is applicable for each separate discharge that may issue from the site location.

The point of compliance for WLAs for all discharges from MS4, MSGP, CGP, or individual AZPDES permit operations shall be the point of discharge to a reach carrying either a PBC or FBC designated use. All entities subject to individual and general AZPDES permit requirements will be considered to be operating consistent with the provisions of this TMDL if they adhere to the terms of their discharge permits as expressed for *E. coli* concentrations.

#### **LOAD ALLOCATIONS**

Nonpoint source contributions from the watershed may come from either natural background conditions or anthropogenic sources. LAs are calculated by subwatersheds and flow duration categories. Natural background quantification is also accounted for as a separate proration where explicitly allocated.

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**LOAD REDUCTIONS**

Load Reductions (LR) are needed when the existing load is larger than the LA calculated using the TMDL equation. The LR can be calculated by:

$$LR = \text{Existing load} - (\text{LA} + \text{Natural background} + \text{MOS})$$

The percent reduction needed is calculated by using:

$$\% \text{ Reduction} = (\text{LR}/\text{Existing Load}) * 100$$

In cases where the LR is negative, no reduction is necessary. These categories are identified as meeting the category allocation. In instances where the inclusion of the margin MOS causes existing loads to exceed the loading capacity, a reduction in the existing load will still be required.

TMDLs identify the amount of pollutant that can be assimilated by the waterbody and still meet water quality standards. The pollutant of concern requiring TMDLs for the Little Colorado Reach 004 is *Escherichia coli* (*E. coli*). In order to calculate the load in giga (billion)-organisms per day (G-orgs/day) from discharge in cubic feet per second (cfs) and densities in colony-forming units per 100 milliliters (cfu/100 ml), a conversion factor is required:

$$\text{ft}^3/\text{sec} * 28.32\text{L}/\text{ft}^3 * 86,400\text{sec}/\text{day} * \text{org}/100 \text{ ml} * 1000\text{ml}/1\text{L} * 1\text{G-org}/1\text{E}09 \text{ org} = 0.02446 \text{ G-org}/\text{day}$$

The conversion factor of 0.02446 was used in the following equation:

$$\text{Existing Load} = Q * [\text{E. coli density (cfu/100 ml)}] * 0.02446$$

**TABLES**

The following tables detail the TMDL targets and reductions necessary for Reach 15050203-001. Table 1 addresses wasteload allocations for AZPDES permittees in the watershed. Table 2 gives a detailed breakdown by flow class of TMDL targets, natural background, aggregate load allocation capacity, aggregate wasteload allocations, and percent reductions needed to attain WQ standards. Table 3 details the breakdown of the aggregate load allocation by land use and contributing subwatershed.

**Table 1. Wasteload Allocations for Permittees in the San Pedro basin**

<i>Facility</i>	<i>Design capacity (million gallons per day)</i>	<i>Equivalent Discharge (CFS)</i>	<i>Permit Concentration Limits (cfu/100 ml)</i>	<i>Load at Max Discharge, G-org/day</i>
Bisbee (San Jose)	1.22	1.89	235	10.8
Benson	1.2	1.86	235	10.7
Mammoth	0.65	1.01	575	14.2
Sierra Vista Tribute	0.5	0.77	575	10.8
Tombstone	0.25	0.39	575	5.45

**Table 2. TMDL Targets, Elements, and Reductions**

<i>San Pedro Reach 15050203-001</i>	<i>Category 1: Baseflow</i>	<i>Category 2: Stormflow</i>
Natural Background, G-org/day	4.98	32.18
Existing Conditions (90 <sup>th</sup> P-tile), G-org/day	9.43	23,100
Number of samples	29	11
Median Category Flow	6.4 cfs	23 cfs
TMDL, G-org/day	36.79	132.21
Margin of Safety	3.7	13.22
Aggregate Load Capacity, G-org/day	33.09	118.99
Aggregate Waste Load Allocations	*	51.98
Cumulative Load Allocation	28.11	34.83
Cumulative Reduction Needed	<b>Meets</b>	<b>99.48%</b>
Load Allocation Reduction Needed	<b>Meets</b>	<b>99.85%</b>

\*Concentration-based wasteload allocations applied in keeping with permit terms. Sum of WLAs exceeds load target in baseflow conditions.

**Table 3. Subwatershed Load Allocations by Land Use**

**Load Allocations, Stormflow, by Percent Land Use (NLCD 2006)**

Stormflow Cumulative Load Allocation:		34.83 G-org/day							
Area, sq mi	Name	Watershed Use:		Agricultural Land Use		Grazing Allotment Land Use		Other Land Use	
		Percentage	Load	Percentage	Load	Percentage	Load	Percentage	Load
1785.21	Hydrologic Unit Code 15050202	0.649%	0.226	30.182%	10.512	9.318%	3.245	40.149%	13.984
1161.16	Hydrologic Unit Code 15050203	0.098%	0.034	24.514%	8.538	1.503%	0.523	26.114%	9.096
557.59	Aravaipa Creek Subwatershed	0.013%	0.004	12.281%	4.277	0.246%	0.086	12.540%	4.368
137.75	Putnam Wash Subwatershed	--	--	3.097%	1.079	0.001%	0.0004	3.098%	1.079
123.20	Reach 15050203-001 Subwatershed	0.029%	0.010	2.014%	0.701	0.728%	0.253	2.771%	0.965
681.56	Mexico (Undifferentiated) Total	--	--	--	--	15.328%	5.339	15.328%	5.339
Total Area:	Subtotal Percentages:	0.789%		72.088%		27.124%		100.0%	
4446.47	Subtotal Loads:		0.275		25.108		9.447		34.830

**SUMMARY OF COMMENTS**

Comments were received from counsel for BHP Copper Inc. and Region 9 of the USEPA. Below is a summary of the comments and ADEQ's responses.

**BHP Copper Inc. comments and responses**

*BHP owns four mining facilities currently undergoing reclamation and closure within the watershed discussed in this document. BHP's Camp Grant Quarry is situated essentially at the confluence of Putnam Wash and Aravaipa Creek with the San Pedro River, which is the upstream limit of the impaired reach addressed in the TMDL. As such BHP filed the Notice of Intent for Arizona's Stormwater Multi-Sector General Permit (MSGP-2010) consistent with this location status and it was our full expectation that the TMDL and associated waste load allocations would address the Camp Grant Quarry. However, we did not anticipate that the TMDL would address the other three facilities located from 10 to 25 river miles upstream of the impaired reach.*

*It is our understanding that the San Pedro River supports perennial flow only in two locations: 1) a short reach near Sierra Vista; and 2) in the impaired reach from the confluence of Aravaipa Creek to the San Pedro's confluence with the Gila River (TMDL, p. 9). The river network located upstream of the impaired reach may only impact the impaired reach during certain storm conditions (TMDL, p. 9). "Critical conditions for E. coli exceedances were determined to be exclusively stormflow conditions" (TMDL, p. 6).*

*If impairment only occurs in the lower perennial reach and then only during storm events, it is unclear why the TMDL includes upstream sources of E. coli in the TMDL. Only sources located in the immediate headwaters of the study area (i.e., Aravaipa Creek and the lower 12 miles of the San Pedro River) should be subject to the TMDL. If ADEQ has determined that upstream reaches of the San Pedro River network are also impaired in the same way that Reach #15050203-001 is impaired (i.e., during storms only), then this data should be presented to justify inclusion of these reaches in the TMDL. If such data are not available or are insufficient, then ADEQ should consider additional study of the upstream river network during storm events prior to finalizing the TMDL.*

*The linkage analysis (Section 5.0) states that "a broad-scale approach in consideration of linkages to water quality data collected" is needed, in part due to the "relative scarcity" of E. coli data elsewhere in the watershed (TMDL, p. 24). This statement suggests that additional data upstream of the impaired reach would improve the overall effectiveness of the TMDL by narrowing the linkages to water quality impairment.*

**ADEQ Response**

The San Pedro River watershed has a severe water quality problem for *E. coli* in stormflow conditions posing a human health risk for residents and visitors alike, with reductions in excess of 99% (two orders of magnitude) called for in stormflow conditions to bring the impaired reach to attainment of water quality standards. The Arizona water quality standard for *E. coli* makes no exception for stormflows when determining exceedances or impairments, and as the TMDL has identified stormflows as the critical conditions to be addressed in the watershed to improve bacteriological water quality, the areal extent from which stormflow pulses originate in the watershed must be accounted for. This includes the entire delineated watershed, from the impaired reach's confluence with the Gila River extending into Sonora, Mexico. The San Pedro River watershed consists of an interconnected hydrologic network, with no major reservoirs interrupting hydrologic continuity, and water from the upper reaches of the watershed transits the entire network to the impaired reach in stormflow conditions. Existing loading higher in the watershed is conveyed by precipitation events causing hydrologic responses to the impaired reach. This is why critical conditions of storm-

flow were identified in the TMDL document for the improvement of bacteriological water quality; critical conditions are those conditions most necessary to address to resolve the issue. The bacteriological water quality problem will not be mitigated by limiting the areal extent of investigation to the immediate vicinity of the impaired reach or by considering only baseflow conditions and perennial flow segments as BHP suggests. Therefore, stormflow conditions must be considered and dischargers throughout the watershed, not just those in the immediate vicinity of the impaired reach, must be subject to the terms and provisions of the TMDL.

Impairment and *E. coli* exceedances are not occurring only in the lowest reach of the river. While this project has focused on the area immediately around the impaired reach, it is not being done in isolation, and in addition to TMDL monitoring, ambient and volunteer monitoring is taking place throughout the watershed. Two additional San Pedro reaches (Reach 15050202-003 SPR – Babocomari Creek to Dagoon Wash; Reach 15050202-008 SPR – Mexico border to Charleston) have been listed as impaired for *E. coli* further upstream, and *E. coli* exceedances of the state water quality standard have been observed in many different locations throughout the watershed. The upper San Pedro sub-watershed water quality impairment is currently being addressed through federal 319 funding and watershed group activity to improve land use practices in the Benson and St. David areas and for reaches further upstream.

*E. coli* exceedances as a result of stormflow conditions are a pattern on the San Pedro River main-stem throughout the watershed, and ADEQ has noted in its study that loads of *E. coli* appear to be cumulatively increasing as one travels downstream in the network, suggesting that loading contributions are coming from many different subwatersheds throughout the main watershed. The size of the watershed (approximately 4400 square miles) and the number of sub-watersheds and tributaries in the San Pedro network require an iterative and piecemeal approach for complete characterization. To gain a comprehensive picture of the poor bacteriological water quality of the San Pedro River watershed will take multiple studies and projects; the detailed picture cannot be completely encompassed in a single project like this one. Characterization of other sampling efforts in the watershed and the resulting assessments of other reaches has not been presented in the TMDL due to the defined scope of this project. Each of the designated impaired reaches will have its own TMDL with its own associated field study and supporting data. The additional data BHP suggests including will be presented in these additional TMDL studies when they are put forth.

BHP cites language in the TMDL regarding “relative [data] scarcity” as supportive of their contention that additional data from upstream reaches should be included in this TMDL. The language BHP cites is not intended to convey that adequate data is not available to ascertain there are *E. coli* problems causing the designation of impairment elsewhere in the watershed. On the whole, the dataset conclusively demonstrates the existence of a persistent and high-magnitude problem with *E. coli* with loading contributed from throughout the watershed. ADEQ’s mention of the necessity of a broad-scale approach in considering linkages to water quality data due to the “relative scarcity” of *E. coli* data elsewhere in the watershed referred to the amount of data necessary to draw sound statistical inferences for the purpose of isolating source areas for various subwatersheds and determining reductions where possible. This purpose requires a much greater number of samples for specificity than the broad-scale considerations mentioned in the narrative. When coupled with the high number of tributaries and subwatersheds to be considered in the entire watershed, comprehensive detail of this sort is not consistent with the scope of this single TMDL project at the base of the watershed. While ADEQ agrees in principle that more data from additional potential source areas is preferable when feasible, personnel and resource constraints limit the amount of territory that can be intensively monitored and characterized in a watershed of this size, given the transient nature of stormflow pulses in the watershed and the temporal limitation of a six hour holding time for processing and incubation of samples. ADEQ focused this study on contributions from the adjacent major subwatersheds, tributaries in the impaired reach’s subwatershed, and main-stem San Pedro River contributions as far south as Mammoth. ADEQ expects that other San Pedro River *E. coli* TMDLs will complete the picture with additional data specific to their respective scopes, thus allowing for a narrowing of linkages, a more specific itemization of problematic contributing source areas, and quantified reductions from those source areas. Follow-up effectiveness monitoring after TMDL implementation will also endeavor to sample and quantify contributions from further upstream, as loading from the local subwatersheds has now been thoroughly evaluated.

#### **Specific Comments**

**Section 4.1 – Source Assessment:** *If ADEQ includes the distant upstream reaches in the final TMDL, ADEQ should consider making adjustments to the following descriptions of these upstream sources in the TMDL.*

- *Section 4.1.1 – The Mammoth and Tombstone wastewater treatment plants (WWTP) are described as located on tributaries of the San Pedro River. The Mammoth WWTP does not appear to be distally located on a tributary of the San Pedro River, as is the case with Tombstone, AZ. Rather one can see treatment ponds located adjacent to the river north of town near ADEQ’s monitoring station SPSR022.15. We presume, but do not know with certainty, that the WWTP would discharge from these ponds.*
- *Section 4.1.2 – Table 5 identifies three of four BHP stormwater permits issued under MSGP-2010. ADEQ should include the fourth facility, which was applied for as “BHP COPPER INC – PLANT SITE”; Longitude 110 35 53.92;*

*Latitude 32 38 18.50; Begin Date 2/1/2011; End Date 1/31/2016; San Manuel. When ADEQ provided the NOI Certificate (Authorization Number AZMSG-62471) the suffix "PLANT SITE" was omitted. Thus authors of the TMDL may have assumed the "MINE SITE" listing in Table 5 was the same site but in fact there are two sites (Mine and Plant) with two separate permit authorizations.*

#### **ADEQ Response**

The Town of Mammoth actually has two WWTPs under permits with ADEQ. The Cielo plant itemized in the TMDL document has both an APP and AZPDES permit in issuance since 2006 authorizing discharges to the waters of the United States, but the plant is not due to be constructed until mid-2014. This is the facility that is given the WLA in the TMDL document. It will be located in T9S R15E S11 at 32° 40' 20", 110° 46' 41" and will discharge when necessary to a unnamed wash tributary to Camp Grant Wash, tributary to the San Pedro River.

The Town of Mammoth WWTP adjacent to the San Pedro River that BHP refers to in the comment letter is itemized in Table 6 in the TMDL document, but it is not authorized to discharge to the waters of the United States. It is covered under an Aquifer Protection Permit (P-101690) issued by ADEQ intended to protect groundwater quality. It does not discharge to the San Pedro River and thus has not received a WLA in the TMDL. The effluent from this plant is disposed of by evaporation and percolation. Any unintentional discharges from the plant due to flooding of the San Pedro River and overtopping of the ponds would be considered an unauthorized discharge and subject to treatment as such by the Department.

#### **Section 4.1.2**

Thank you for the clarification of BHP's MSGP permit coverage. The appropriate updates to the document have been made, and other non-mining and industrial permittees covered under the MSGP have also been added to Table 5 since BHP's comment letter was received. All general permittees are subject to the concentration-based WLA outlined in the TMDL document. Further discussion on this point is presented in Section 8.2.2.

**Section 5.0 – Linkage Analysis:** *In the fourth paragraph, it appears that the town of Mammoth is considered in the 0.2 percent of the buffered (4,000 [sic] meter) area along the San Pedro reach. This would be correct and further suggests a more proximal location of the WWTP discussed above. However, when further discussing other communities the paragraph goes on to state that "...with the exception of San Manuel, these communities are several miles away from the main course of the SPR." In fact San Manuel is also located distally from the San Pedro River, with the populated areas ranging from about 3 ¼ to 4 ¾ air miles from the main stem of the river.*

#### **ADEQ Response**

The discussion of urban footprints in the TMDL document is intended to present an evaluation of the relative probabilities of *E. coli* loading from stormwater runoff of these communities to the San Pedro River. While BHP is correct that San Manuel is not on the San Pedro River and is in fact three to four miles away, the language in the document was drafted to present a somewhat higher probability for San Manuel run-off reaching the San Pedro than that of either Sierra Vista (7 miles from outskirts) or Tombstone (also approximately 7 miles). ADEQ notes earlier in the paragraph that only Benson and Mammoth are identified as being directly on the river's main-stem.

**7.0 – Natural Background:** *It is not possible to reconcile data presented in Table 8 with the discussion in the text. Background loading during baseflow conditions was established at two sites using fifteen sampling events to obtain 4.98 G-orgs/day. Table 8 indicates E. coli concentrations and loads, but shows a total of 39 baseflow samples, not 30 (2 sites x 15 events). Stormflow conditions were monitored using a total of 90 samples, from 18 sites, representing 11 waterways. Yet Table 8 provides data for only 40 samples. Locations of these samples are not identified.*

*According to the discussion, background loading under baseflow conditions was determined from two monitoring sites on Aravaipa Creek. This approach overlooks loading from the 4,000 [sic] meter buffer zone along the impaired reach of the San Pedro River proper, which includes agriculture and grazing sources. These two sources were identified as potential E. coli sources in Section 4.2 of the TMDL during storm events. However, both of these sources can provide E. coli during baseflow conditions as well.*

*Also, according to the discussion, stormflow loading has a median E. coli value of 12.46 cfu/100 ml. This result appears rather low given that the Full Body Contact standard for E. coli is 235 cfu/100 ml. The 12.46 cfu/100 ml value was determined using all 90 data points, which are the sum of an undisclosed number of stormflow and baseflow samples from undisclosed locations. Obtaining such a relatively low E. coli median concentration for stormflow conditions suggests one of the following:*

- *Most of the 90 samples used for baseline stormflow represent baseflow conditions; and/or*
- *Stormflow conditions in the 10 or fewer (undisclosed) waterways above the impaired reach of the San Pedro River yield relatively high quality samples and do not contribute to the impairment.*

*Implementation of a TMDL for E. coli would be highly influenced by these outcomes. For example, if high quality stormflow samples are obtained from San Pedro main stem and tributary reaches located above the impaired reach, then reductions in the E. coli loads in these reaches would not be necessary. However, if in these reaches the "...E. coli densities spike abruptly to many times over the standard..." as described in Section 2.3 Hydrology (TMDL, p. 9), then proposed waste load allocations in the waterway network located above the impaired reach would be necessary.*

#### ADEQ Response

With regard to Table 8, ADEQ clarifies that the table does not present natural background data, but actual TMDL data in the impaired reach from which existing loading and reductions were calculated. This is referenced previously in Section 6.0 where the topic of Table 8 is mentioned in the narrative. ADEQ acknowledges that the placement of the table in the document is confusing and thus we have repositioned the table ahead of Section 7.0 and in closer proximity to the section where it is referenced.

Natural background in the TMDL analysis establishes a baseline value for waterways without any (or with only minimal) anthropogenic influence. The objective in sampling natural background is to collect high quality samples that represent only natural loading if possible. While necessary to be classified and quantified in a TMDL summation, the natural background allocation is not subject to reduction calculations or attempted mitigation.

We attempt to minimize anthropogenic influence in choosing background sampling sites while still allowing for sufficient hydrologic response to evaluate loading. Implicit in the determination of natural background conditions is the necessity of using data from contributing tributaries in the hydrologic network that are not impaired and not subject to as much or as extensive a set of land use practices. Because contributions from tributaries are ultimately components of the total loading in the impaired reach, this approach gives the best empirical window on natural loading. The impaired reach of the San Pedro River under consideration is not an appropriate choice for natural background determination precisely because it is already impaired due to anthropogenic influences. The 400 meter buffer alluded to in BHP's comments falls into this category, as road crossings, agriculture, grazing, and other influences are present within the buffer zone. Thus, attempting to derive any estimates of natural loading from an area that already is impaired by land use practices would be inaccurate and counter-productive.

Due to the amount of background data used for evaluation on multiple tributaries throughout the watershed, ADEQ did not present the natural background data for either the baseflow or the stormflow set in the document. Both sets include historic ADEQ data on tributaries to the San Pedro River other than first-order tributaries (thus allowing for hydrologic process to operate, as mentioned) sampled throughout the watershed. For baseflow conditions, two sites were chosen in the Aravaipa Canyon Wilderness area to evaluate natural background loading. The Wilderness Area is an excellent location to get a read on natural background. Some minor *E. coli* loading may be contributed from above the Canyon, but the Canyon is by far the best option for evaluating contributions to the San Pedro in baseflow conditions, as no development or use of the area except for human recreation is permitted. Wildlife is reasonably expected to be the only contribution to *E. coli* loading in the Canyon. Values of *E. coli*, as expected and reported in the document, were low, and ADEQ believes that for baseflow conditions, background loading has been accurately characterized.

ADEQ acknowledges that BHP has raised a valid concern regarding the assessment of natural background for the stormflow dataset. For most of this data, field notes frequently did not indicate whether the samples were baseflow samples or stormflow samples. Unfortunately, there is no infallible method of separating the two classes if the regime was not recorded at sampling time. As BHP has observed, the dataset is a mix of baseflow and stormflow data, and the use of a measure of central tendency like the average and/or median, as outlined in the document, is likely suppressing the background loading to a lower value than is warranted in actuality. Consequently, based on BHP's input, ADEQ re-evaluated the method and results of stormflow natural background loading. The 90<sup>th</sup> percentile value for the concentrations of the entire dataset was used with the median stormflow discharge in the impaired reach to provide a new and higher natural background loading value of 32.18 G-orgs/day (as compared to the previous value of 7.01 G-orgs/day) for use in the TMDL summation. The use of this higher percentile value instead of a measure of central tendency should ensure that a representative stormflow loading data value is being utilized rather than what is more likely now a value reflecting baseflow conditions. The higher natural background loading thus determined shall concomitantly reduce the aggregate loading allocation available for nonpoint source pollutants in the reach.

**Section 8.2.2 – Waste Load Allocations:** *Concerns regarding data collection for use in the TMDL previously discussed are largely remedied for existing and future dischargers by ADEQ's approach to waste load allocations. Water quality-based concentration limits for stormwater dischargers, with flow-based loads for WWTPs, will assure these sources do not cause or contribute to exceedances of the standard. Nevertheless, ADEQ should clearly show the relevance of subjecting dischargers located upstream of the impaired reach to the TMDL and waste load allocation.*



*Specifically, the draft TMDL should provide clear data linking the relevance of reduced E.coli loading in these waterways to favorable affects in the impaired reach.*

**ADEQ Response**

Since the TMDL discusses loading from the entire watershed of the San Pedro River, the omission of an assignment of a WLA to any existing discharger covered under an individual or a general permit could limit the ability of permittees to discharge the TMDL constituent of concern. EPA and ADEQ interpret the absence of specified coverage of WLAs in a TMDL as meaning that the WLA has been set to 0 loading units/day, i.e. the constituent is not accounted for in the analysis and thus not allowed in discharges. The reasoning for this approach is clear: as a TMDL is a pollutant budget, the budgeting cannot be an effective tool to improve water quality if portions of the budget are disregarded, set off limits, or if the budget is not co-extensive with the project scope, or otherwise not comprehensive in its application. The WLA works in tandem with a water quality discharge permit to allow for the discharge of the constituent of concern in quantities and concentrations consistent with the permit terms and the loading analysis. ADEQ makes every effort in TMDL analyses to grant WLAs fully consistent with issued permits' terms whenever possible so as to minimize disruption of operations and burden on permittees.

**EPA comments and responses**

- *It is unclear which permittees are covered under the MS4 and assigned a Waste Load Allocation (WLA). Please clearly state the name and total number of MS4s and/or Phase II MS4s to which you are assigning a WLA. If there are any co-permittees (a few cities that are co-responsible for a permit), please also clarify this as well.*

ADEQ has added additional discussion regarding MS4s in the project area to Sections 4.1.1 and 8.2.2.

- *2) Arizona Department of Transportation (ADOT) appears to own property (State Route 77 and 177) within the watershed and near the impaired reach of the San Pedro River; however they are not mentioned in the TMDL. Should the Statewide ADOT MS4 be included in the TMDLs and assigned a WLA consistent with the other MS4s? If a WLA is not clearly defined, then their WLA is equal to zero.*

ADEQ has added discussion of ADOT's highway MS4 coverage to the pertinent sections. Highway 177 is not addressed in this new discussion, as in its entirety, it is not located in the San Pedro River watershed, but downstream of the TMDL project area adjacent to the Gila River.

- *3) For the WLAs established for the MS4s, MSGP, CGP, and WWTP, please state where (e.g., location) the dischargers are expected to meet the WLAs (i.e., point of compliance).*

ADEQ has general language already incorporated in Section 8.2.2 establishing the point of compliance for WLAs as the discharge point to either a stream carrying a Full Body Contact (FBC) or Partial Body Contact (PBC) designated use. The following statement with greater specificity was added to Section 8.2.2:

*The point of compliance for WLAs for all discharges from MS4, MSGP, CGP, or individual AZPDES permit operations shall be the point of discharge to a reach carrying either a PBC or FBC designated use.*

ADEQ has also added the following language to a paragraph pertaining to WLAs in Section 8.2.2:

*Beyond the general guidelines presented in the following paragraph regarding points of compliance for WLAs (discharge locations to waters of the State carrying either a PBC or FBC designated use), the [ADEQ] Stormwater Unit shall establish more specific locations on a case-by-case basis where dischargers under all general permits (MS4, MSGP, CGP) issued by ADEQ are expected to meet their WLAs when necessary.*

It is anticipated that such establishments of specific locations would occur during the Stormwater Unit's review of SWMPs and SWPPPs for general permittees when these arise.

Additional specificity on a case-by case basis for numerous existing permittees in the context of the TMDL is not advisable. Permittees covered under these permits turn over rapidly in many cases.

**4. Name and address of agency personnel with whom persons may communicate:**

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Copies of the final TMDL may be obtained from the Department by contacting the numbers above. The final TMDL may also be downloaded from the Department's web site at: <http://www.azdeq.gov/environ/water/assessment/status.html>.